

CLAIMS

What is claimed is:

1. A voltage verification system for an electrical system, comprising:
5 a processor unit coupleable to a voltage detection system, wherein at least one of the voltage detection system and the processor unit is operable to convert a voltage detected by the voltage detection system into a digital signal, the processor unit being operable to provide an output representative of an operational condition of the electrical system based on the digital signal and data stored in the processing unit.
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2. The system as recited in claim 1, comprising the voltage detection system, wherein the voltage detection system is operable to detect a plurality of voltages and provide a signal representative thereof to the processor unit.
- 15 3. The system as recited in claim 2, wherein the voltage detection system is electrically coupled to the processor unit.
4. The system as recited in claim 2, wherein the voltage detection system is optically coupled to the processor unit.
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5. The system as recited in claim 2, wherein the voltage detection system comprises at least one contact voltage detector.

6. The system as recited in claim 2, wherein the voltage detection system comprises at least one non-contact voltage detector.

7. The system as recited in claim 1, wherein the data stored in the processing unit comprises a defined output representative of an operational condition for each possible combination of values for the digital signal.

8. The system as recited in claim 1, wherein at least one operational condition corresponds to a loss of electrical continuity between a plurality of components of the electrical system.

9. An electrical system, comprising:
an electrical connector operable to connect an electrical device to an external source of power; and
a voltage verification system operable to detect voltage at a location upstream of the electrical connector and at a location downstream of the electrical connector and to provide a positive indication if a no-voltage condition is detected at at least one of the location upstream of the electrical connector and the location downstream of the electrical connector.

10. The system as recited in claim 9, comprising a switch electrically coupled to the electrical connector, wherein the location downstream of the electrical connector is located downstream of the switch.

11. The system as recited in claim 10, comprising a short-circuit preventing device, wherein the voltage verification system is operable to detect voltage at a location downstream of the short-circuit preventing device.

5 12. The system as recited in claim 11, wherein the voltage verification system provides a positive indication that the electrical device is de-energized when voltage is detected at the location upstream of the electrical connector and no voltages are detected at the location downstream of the switch and downstream of the short-circuit preventing device.

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13. The electrical device as recited in claim 11, wherein the voltage verification system comprises a logic circuit and the voltage verification system is adapted to convert each voltage detected into an input to the logic circuit.

15 14. The electrical device as recited in claim 13, wherein the logic circuit is programmed to produce a defined output corresponding to each possible combination of inputs to the logic circuit.

20 15. The electrical device as recited in claim 10, wherein the voltage verification system comprises an indicator disposed on the exterior of the electrical device, the indicator being operable to produce a visible indication corresponding to each of the plurality of outputs.

16. An electrical system, comprising:

an enclosure;

an electrical device housed within the enclosure and electrically coupled to a power line through the enclosure;

5 a voltage verification system operable to produce a digital signal representative of line voltage detected at a location external to the enclosure and at plurality of locations internal to the enclosure, wherein the voltage verification system is operable to process the digital signal to produce an output based on an algorithm stored within the voltage verification system.

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17. The system as recited in claim 16, wherein the power line comprises a three-phase power bus.

18. The system as recited in claim 17, wherein the electrical device comprises
15 a motor controller electrically coupleable to the three-phase power bus to couple three-phase power to an electric motor

19. The system as recited in claim 17, wherein the electrical device comprises
a switch operable to selectively isolate the electrical device from the three-phase power
20 bus.

20. The system as recited in claim 19, wherein the electrical device comprises a switch operable to selectively isolate the electrical device from the three-phase power bus.

5 21. The system as recited in claim 20, wherein the voltage verification system is operable to detect voltage in each phase of the three-phase power bus and in each phase downstream of the switch.

10 22. The system as recited in claim 20, comprising a short-circuit preventing device located in each phase downstream of the switch, the voltage verification system being operable to detect voltage in each phase between the switch and the short-circuit preventing device in each phase downstream of each short-circuit preventing device.

15 23. The system as recited in claim 20, wherein the voltage verification system comprises a bus voltage module disposed within the enclosure and a first voltage sensor located external to the enclosure to provide a signal representative of line voltage to the module, the module being electrically isolated from the power line.

20 24. The system as recited in claim 23, wherein the first voltage sensor comprises a light emitter and the module comprises a light receiver.

25. The system as recited in claim 23, wherein the first voltage sensor is a non-contact voltage sensor.

26. The system as recited in claim 23, wherein the voltage verification system
5 comprises a plurality of voltage sensors disposed within the electrical device and electrically coupled to the module.

27. The voltage verification system as recited in claim 23, wherein the voltage
verification system comprises a logic module coupled to the bus voltage module, the logic
10 module being programmed to produce a specific output for each possible value of the digital signal.

28. The motor control center as recited in claim 27, wherein the voltage
verification system is coupleable to a communications network to provide the specific
15 output to the communications network.

29. A method of accessing the interior of an electrical device coupled to power,
comprising:
viewing a positive indication provided by a voltage verification system that no
20 hazardous voltages are present within the electrical device; and
opening an access into the interior of the electrical device after viewing the positive
indication that no hazardous voltages are present within the device.

30. The method as recited in claim 29, wherein the positive indication represents that the system detected a voltage upstream of an isolation switch and detected no voltage downstream of the isolation switch.

5 31. The method as recited in claim 29, comprising entering the interior of the electrical device.